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(71)Applicant : AISIN SEIKI CO LTD

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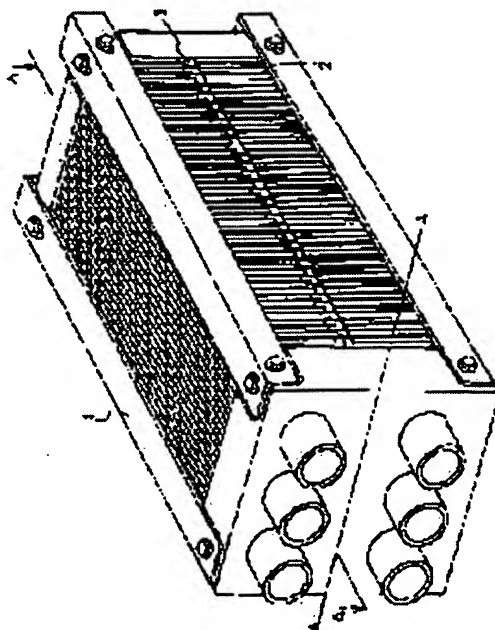
(72)Inventor : OKAZAKI HIROSHI
KUNIEDA KENJI
KAJIO KATSUHIRO

(54) FUEL CELL STACK WITH CELL VOLTAGE MEASURING TERMINAL

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a fuel cell stack with a terminal for measuring the voltage of an individual cell, suitable for a thin separator.

SOLUTION: A pin-shaped or an L-shaped projecting terminal 3 is installed integrately with a separator, or by bonding such as soldering or projection welding on the end surface of a separator as a terminal for measuring voltage of each cell 2 of a fuel cell. The terminal 3 is arranged so that a positive terminal is arranged on a first end surface of the separator on a cathode side and a negative terminal is arranged on a third end surface of the separator on an anode side, or the positive terminal of the separator on the cathode side and the negative terminal of the separator on the anode side are arranged on the same end surface side in the displaced positions each other.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a fuel cell stack.

[0002]

[Description of the Prior Art] A fuel cell is equipment which fuel gas (principal component: hydrogen), oxygen, or air is made to react electrochemically, and acquires electromotive force, since it is only about 0.7V at most, generally the electromotive force of the cell according to each carries out the laminating of the dozens to hundreds cells, and one fuel cell stack is constituted and it is used.

[0003] Measurement of each cell electrical potential difference is performed as a means to get to know whether it is in a condition with each normal cell which constitutes a fuel cell stack. Since the electrical potential difference of the cell falls notably during operation of a fuel cell when one cell is damaged, if the electrical potential difference of an individual cell is measured, it can turn out that abnormalities occurred and operation of a cell can be suspended promptly. When detection of generating of abnormalities is overdue, there is a possibility that breakage may spread.

[0004] As a conventional technique, a round hole is prepared in the separator of comparatively thick carbon material, and the structure which inserts a banana clip is indicated by JP,9-283166,A.

[0005]

[Problem(s) to be Solved by the Invention] By the approach of said conventional technique, when a separator is to some extent thick, it is possible, but when a separator is made thin for the miniaturization of a fuel cell, it cannot respond. This invention offers the fuel cell stack which has a suitable cell potential tap for a thin separator.

[0006]

[Means for Solving the Problem] in order to solve the above-mentioned technical problem, the technical means provided in claim 1 of this invention be fuel cell stacks with a cell potential tap characterize by prepare the terminal of the lead of a projection for amplitude measurements in said separator in the fuel cell stack which consist of an electrode unit and a separator, and the fuel gas, oxygen, or the air which use hydrogen as a principal component be make to react in said electrode unit, and be change into an electrical and electric equipment.

[0007] The effectiveness by these technical means is being able to attach the terminal for amplitude measurements, even if the thickness of a separator becomes thin, since it is not necessary to make a hole in the end face of a separator.

[0008] The technical means provided in claim 2 of this invention are fuel cell stacks with a cell potential tap according to claim 1 characterized by said terminal being the projection of the shape of a vertical pin to the end face of a separator.

[0009] The effectiveness by these technical means is that the socket of the lead wire which measures an electrical potential difference is easily connectable with a terminal.

[0010] The technical means provided in claim 3 of this invention are fuel cell stacks with a cell potential tap according to claim 1 characterized by said terminal being a L character-like projection to the end

face of a separator.

[0011] The effectiveness by these technical means is being able to press down the amount of projection of the socket linked to a terminal, and being able to make appearance size of a stack small.

[0012] The technical means provided in claim 4 of this invention are fuel cell stacks with a cel potential tap according to claim 1 characterized by arranging + terminal to the 1st end face of the separator by the side of an anode plate, and said terminal arranging - terminal to the 3rd end face of the separator by the side of cathode.

[0013] Sense terminals contact and the effectiveness by these technical means is that possibility of short-circuiting falls, even if a cell cel becomes thin and each separator approaches.

[0014] The technical means provided in claim 5 of this invention are fuel cell stacks with a cel potential tap according to claim 1 characterized by for said terminal shifting a location and arranging + terminal of the separator by the side of an anode plate, and - terminal of the separator by the side of cathode to the same end-face side.

[0015] Sense terminals contact, and the effectiveness by these technical means can take out wiring of an amplitude measurement only from one side of the side face of a stack, and since it can pack + terminal and - terminal into a double-tracked lead wire, it can perform the miniaturization of a fuel cell stack, at the same time it reduces possibility of short-circuiting.

[0016]

[Embodiment of the Invention] Hereafter, the example of this invention is explained based on a drawing.

[0017] Drawing 1 is the appearance of the fuel cell stack 1 of a solid-state macromolecule mold which prepared the potential tap of this invention. The laminating of many cels 2 is carried out. The L character-like potential tap 3 is in the side face before this fuel cell stack 1. A separator and one are sufficient as this terminal, and it may be produced independently and may be joined by soldering, projection welding, etc.

[0018] Said fuel cell stack 1 is the type it have arranged + terminal to the 1st end face of the separator by the side of an anode plate, and has arranged - terminal to the 3rd end face of the separator by the side of cathode, and - terminal is attached in the side face of the flesh side which is not visible by a diagram.

[0019] Any of four end faces of a separator are sufficient as the 1st end face here. Moreover, although the end face of the opposite hand of 1st end face of a thing called the 3rd end face is said, - terminal may be arranged to the 2nd and 3rd end face.

[0020] Drawing 2 is AA cross-section exploded view of drawing 1 explaining arrangement of a separator and an electrode unit. With this cross-section exploded view, two cels consist of three kinds of separators as one unit.

[0021] Electrode unit 5a is arranged between separator 4a and separator 4b, and electrode unit 5b is arranged between separator 4a and separator 4c.

[0022] Between separator 4a and electrode unit 5b, air flows between separator 4b and electrode unit 5a, and hydrogen is flowing between separator 4a and electrode unit 5a and between separator 4c and electrode unit 5b.

[0023] There is no electrode unit between separator 4b and separator 4c, and cooling water is flowing. The potential tap 3 is arranged at the edge of Separators 4a and 4c.

[0024] The electrode units 5a and 5b have structure whose macromolecule ion exchange membrane 8 which is an electrolyte was pinched with the electrode of two sheets of the air pole 7 which is the hydrogen pole 6 and anode plate which are cathode. The slot used as the path of air, hydrogen, or cooling water is formed in Separators 4a, 4b, and 4c.

[0025] Usually, in one unit, one cooling water path 16 is included like this example. Of course, the cooling water path 16 may be arranged for every cel, and does not need to prepare the cooling water path of dedication.

[0026] Since it is producible by the thickness below the thickness of a separator 4, the potential tap 3 of this example can be attached even if a separator 4 becomes thin. Moreover, since + terminal and - terminal are prepared in the side face of objection of the fuel cell stack 1, an electric short circuit

generates and is safe.

[0027] In addition, the aforementioned + terminal and - terminal can be shifted on the same side face of the fuel cell stack 1 up and down, and can also be prepared in it. If it carries out like this, while the possibility of an electric short circuit can be reduced, since the lead wire of + terminal and - terminal can be packed, the miniaturization of a fuel cell stack can be performed.

[0028] Various means of attachment of a potential tap are considered. Drawing 3 -5 are the top view of the separator 4 possessing a potential tap. The separators 4 of these examples are metal, such as aluminum and stainless steel.

[0029] The air charging path 9, the cooling water path 10, the hydrogen charging path 11, the air flueway 12, and the hydrogen flueway 13 are formed in the separator 4.

[0030] Four end faces of a separator 4 name it the 1st end-face 17a, the 2nd end-face 17b, the 3rd end-face 17c, and the 17d of the 4th end face, respectively.

[0031] Drawing 3 is the top view of the separator 4 which welded pin-like potential tap 3a to the 1st end face by projection welding etc. It says the thing of the shape of a rod projected in the straight line, and a circle, the polygon of that of pin-like ****, etc. are pillar-shaped, and it is good here also tabular.

[0032] Drawing 4 is the top view of the separator 4 which produced L character-like potential tap 3b by one to the case of drawing 3, and the 3rd end face. The shape of L character bends the thing of the shape of said pin to L characters here.

[0033] Drawing 5 is the top view of the separator 4 which produced the pin-like potential tap 11 by one to the case of drawing 3, and the 3rd end face.

[0034] Drawing 6 expands a part of separator 4 in an explanatory view in case drawing 7 joins L character-like potential tap 3a for 3d of pin-like potential taps to a separator 4 by projection welding etc., and is a thing.

[0035] Lower drawing of drawing on each of drawing 6 and drawing 7 is in the condition after welding about the condition before welding. Although many useless ingredients come out when producing by the separator and one, in junction, there is no it and cost can also be reduced.

[0036] Drawing 8 and drawing 9 are the explanatory views in the condition of having attached in L character-like potential tap 3b and pin-like potential tap 3c the socket 15 which attached the lead wire 14 which measures an electrical potential difference, respectively, and expand a part of separator 4 of drawing 4 and drawing 5, respectively. Thus, it has the structure where lead wire can be attached easily.

[0037] In L character-like potential tap 3b, the amount of projection of the socket which connected compared with pin-like potential tap 3c can be pressed down.

[0038]

[Effect of the Invention] as mentioned above, in the fuel cell stack which consist of an electrode unit and a separator, and the fuel gas, oxygen, or air which use hydrogen as a principal component be make to react in said electrode unit, and be change into an electrical and electric equipment, since this invention be a fuel cell stack with a cel potential tap characterize by prepare the terminal for amplitude measurements of the letter of a projection in said separator, it be a terminal suitable for the thin separator corresponding to a miniaturization of a fuel cell. it connects with this terminal with a socket etc., and the electrical potential difference of each cel under fuel cell operation is measured -- it can be alike rattlingly and the abnormalities of each cel can be detected more promptly.

[Translation done.]